CLAIMS

1. A liquid crystal display component comprising a pair of electrode substrates and a liquid crystal layer placed between the electrode substrates, wherein the electrode substrates are characterized in that (i) the electrode substrates comprise each a transparent polymer substrate (S), a gas barrier layer (X), a hardened resin layer (U) and a transparent conductive layer (E), (ii) the hardened resin layer (U) and the transparent conductive layer (E) are in contact with each other, (iii) the electrode substrates have a water absorption coefficient of 2% or less, (iv) the electrode substrates have a water vapor transmission of 1 g/m^2/day or less in an environment of 40℃ and 90% RH, and (v) the surface in contact with the transparent conductive layer (E) of the hardened resin layer (U) has a surface electric resistivity of 1.0×10^{13} Ω/□ or more in an environment of 50℃ and 30% RH and that of 1.0×10^{12} Ω/□ or more in an environment of 50℃ and 90% RH.

2. A liquid crystal display component according to Claim 1, wherein the hardened resin layer (U) comprises a silicon-containing resin satisfying the following formulae (1), (2) and (3):

$$0.01 < (a)/(b) < 1.0 \quad (1)$$

$$0.01 < (c)/(b) < 0.5 \quad (2)$$

$$0.01 < (d)/(b) < 2.0 \quad (3),$$

herein (a) is the absorbance assigned to an O-H stretching vibration existing near 3500 cm^{-1}, (b) is the absorbance assigned to a C-H stretching vibration existing near 3000 cm^{-1}, (c) is the absorbance assigned to an -NH_2 in-plain deformation vibration existing near 1600 cm^{-1} and (d) is the absorbance attributable to an Si-O existing near 1100 cm^{-1}, in infrared absorption spectrum.

3. A liquid crystal display component according to Claim 2, wherein the silicon-containing resin is a vinyl alcohol-containing polysiloxane resin (P) obtainable from a coating composition containing a vinyl alcohol polymer, an epoxy group-containing silicon compound and an amino group-containing silicon compound or an organic polysiloxane resin (Q) obtainable from a coating composition containing an epoxy group-

containing silicon compound and an amino group-containing silicon compound.

4. A liquid crystal display component according to Claim 1, wherein the electrode substrate further contains a hardened resin layer (B) and a hardened resin layer (C), and the transparent polymer substrate (S), the hardened resin layer (B), the gas barrier layer (X) and the hardened resin layer (C) are in contact with each other in this order.

5. A liquid crystal display component according to Claim 4, wherein the hardened resin layer (B) comprises a vinyl alcohol-containing polysiloxane resin (P) obtainable from a coating composition containing a vinyl alcohol polymer, an epoxy group-containing silicon compound and an amino group-containing silicon compound or an organic polysiloxane resin (Q) obtainable from a coating composition containing an epoxy group-containing silicon compound and an amino group-containing silicon compound, and the hardened resin layer (C) comprises the above-mentioned (P) or (Q).

6. A liquid crystal display component according to Claim 1, wherein the gas barrier layer (X) comprises a metal oxide mainly composed of a silicon oxide having a ratio of the number of oxygen atoms to the number of silicon atoms of 1.5 to 2.0.

7. A liquid crystal display component according to Claim 1, wherein the transparent polymer substrate (S) is mainly composed of polycarbonate or polyacrylate, and has a total light transmittance of 80% or more and a retardation of 20 nm or less.

8. A liquid crystal display component comprising a pair of electrode substrates and a liquid crystal layer placed between the electrode substrates, wherein the electrode substrates are characterized in that (i) the electrode substrates is constructed with a transparent conductive layer (E), a hardened resin layer (U), a transparent polymer substrate (S), a hardened resin layer (B), a gas barrier layer (X) consisting of a metal oxide, a metal nitride or their mixture and a hardened resin layer (C) in this order, (ii) the hardened resin layer (U) and the transparent conductive layer (E) are in contact with each other, (iii) the electrode substrates have a water absorption coefficient of 2% or less, (iv) the electrode substrates have a

water vapor transmission of 0.1 g/m^2/day or less in an environment of 40℃ and 90% RH, and (v) the surface in contact with the transparent conductive layer (E) of the hardened resin layer (U) has a surface electric resistivity of 1.0×10^{13} Ω/□ or more in an environment of 50℃ and 30% RH and that of 1.0×10^{12} Ω/□ or more in an environment of 50℃ and 90% RH.

9. A liquid crystal display component according to Claim 8, wherein the hardened resin layer (U) comprises a silicon-containing resin satisfying the following formulae (1), (2) and (3):

$$0.01 < (a)/(b) < 1.0 \quad (1)$$

$$0.01 < (c)/(b) < 0.5 \quad (2)$$

$$0.01 < (d)/(b) < 2.0 \quad (3),$$

herein (a) is the absorbance assigned to an O-H stretching vibration existing near 3500 cm^{-1}, (b) is the absorbance assigned to a C-H stretching vibration existing near 3000 cm^{-1}, (c) is the absorbance assigned to an $-NH_2$ in-plain deformation vibration existing near 1600 cm^{-1} and (d) is the absorbance attributable to an Si-O existing near 1100 cm^{-1}, in infrared absorption spectrum.

10. A liquid crystal display component according to Claim 9, wherein the silicon-containing resin comprises a vinyl alcohol-containing polysiloxane resin (P) obtainable from a coating composition containing a vinyl alcohol polymer, an epoxy group-containing silicon compound and an amino group-containing silicon compound or an organic polysiloxane resin (Q) obtainable from a coating composition containing an epoxy group-containing silicon compound and an amino group-containing silicon compound, the hardened resin layer (B) comprises the above-mentioned (P) or (Q), and the hardened resin layer (C) comprises the above-mentioned (P).

11. A transparent conductive substrate comprising a gas barrier laminated film, which comprises a transparent polymer substrate (S), a gas barrier layer (X) consisting of a metal oxide, a metal nitride or their mixture, and a hardened resin layer (U), and a transparent conductive layer (E), which is placed in contact with the hardened resin layer (U) of the laminated film, and satisfying the following (i) to (vii):

(i) the water absorption coefficient is 2% or less,

(ii) the total light transmittance is 80% or more,

(iii) the thickness of the transparent polymer substrate (S) is 0.01 to 1.0 mm,

(iv) the retardation of the transparent polymer substrate (S) is 20 nm or less,

(v) the thickness of the gas barrier layer (X) is 5 to 200 nm,

(vi) the thickness of the transparent conductive layer (E) is 1 nm to 1 μm,

(vii) the surface in contact with the transparent conductive layer (E) of the hardened resin layer (U) has a surface electric resistivity of 1.0×10^{13} Ω/□ or more in an environment of 50℃ and 30% RH and that of 1.0×10^{12} Ω/□ or more in an environment of 50℃ and 90% RH.

12. A transparent conductive substrate according to Claim 11, wherein the hardened resin layer (U) comprises a silicon-containing resin satisfying the following formulae (1), (2) and (3):

$$0.01 < (a)/(b) < 1.0 \quad (1)$$

$$0.01 < (c)/(b) < 0.5 \quad (2)$$

$$0.01 < (d)/(b) < 2.0 \quad (3),$$

herein (a) is the absorbance assigned to an O-H stretching vibration existing near 3500 cm^{-1}, (b) is the absorbance assigned to a C-H stretching vibration existing near 3000 cm^{-1}, (c) is the absorbance assigned to an $-NH_2$ in-plain deformation vibration existing near 1600 cm^{-1} and (d) is the absorbance attributable to an Si-O existing near 1100 cm^{-1}, in infrared absorption spectrum.

13. A transparent conductive substrate according to Claim 12, wherein the silicon-containing resin is a vinyl alcohol-containing polysiloxane resin (P) obtainable from a coating composition containing a vinyl alcohol polymer, an epoxy group-containing silicon compound and an amino group-containing silicon compound or an organic polysiloxane resin (Q) obtainable from a coating composition containing an epoxy group-containing silicon compound and an amino group-containing silicon compound.

14. A transparent conductive substrate according to Claim 11, wherein the laminated film has a water vapor transmission of 1 g/m^2/day or less in an environment of 40℃ and 90% RH.

15. A transparent conductive substrate according to Claim 11, wherein a hardened resin layer (B) is placed on the opposite side to the side where the hardened resin layer (U) of the transparent polymer substrate (S) is placed in such a manner that the (B) is in contact with the (S), and the water absorption coefficient of the (B) is larger than that of the (S).

16. A transparent conductive substrate according to Claim 15, wherein the water absorption coefficient of the transparent polymer substrate (S) is 1% or less.

17. A transparent conductive substrate according to Claim 15, wherein the hardened resin layer (B) comprises a vinyl alcohol-containing polysiloxane resin (P) obtainable from a coating composition containing a vinyl alcohol polymer, an epoxy group-containing silicon compound and an amino group-containing silicon compound or an organic polysiloxane resin (Q) obtainable from a coating composition containing an epoxy group-containing silicon compound and an amino group-containing silicone compound.

18. A transparent conductive substrate according to Claim 11, wherein the laminated film further contains a hardened resin layer (B) and a hardened resin layer (C), and the gas barrier layer (X) is placed in contact with the hardened resin layer (B) and the hardened resin layer (C).

19. A transparent conductive substrate according to Claim 18, wherein the hardened resin layer (B) comprises a vinyl alcohol-containing polysiloxane resin (P) obtainable from a coating composition containing a vinyl alcohol polymer, an epoxy group-containing silicon compound and an amino group-containing silicon compound or an organic polysiloxane resin (Q) obtainable from a coating composition containing an epoxy group-containing silicon compound and an amino group-containing silicon compound, and the hardened resin layer (C) comprises the above-mentioned (P) or (Q).

20. A transparent conductive substrate according to Claim 19, wherein the thickness of the gas barrier layer (X) is in the range of 5 to 50 nm.

21. A transparent conductive substrate according to Claim 11, wherein the metal oxide is composed mainly of a silicon oxide having a ratio

of the number of oxygen atoms to that of silicon atoms of 1.5 to 2.0.

22. A transparent conductive substrate according to Claim 11, wherein the transparent polymer substrate (S) is mainly composed of polycarbonate or polyacrylate, and has a total light transmittance of 80% or more, and a retardation of 20 nm or less.

23. A transparent conductive substrate according to Claim 11, wherein the hardened resin layer (A) is placed between the hardened resin layer (U) and the transparent polymer substrate (S) in such a manner that the (A) is in contact with the (U) and (S).

24. A transparent conductive substrate, wherein a gas barrier laminated film is constructed of a hardened resin layer (U), a hardened resin layer (A), a transparent polymer substrate (S), a hardened resin layer (B), a gas barrier layer (X) comprising a metal oxide, a metal nitride or their mixture, and a hardened resin layer (C) which are in contact with each other in this order, a transparent conductive layer (E) is placed on the hardened resin layer (U) of the gas barrier laminated film in contact with the (U), and the transparent conductive substrate satisfies the following (i) to (viii):

(i) the water absorption coefficient is 2% or less,

(ii) the total light transmittance is 80% or more,

(iii) the thickness of the transparent polymer substrate (S) is 0.01 to 1.0 mm,

(iv) the retardation of the transparent polymer substrate (S) is 20 nm or less,

(v) the thickness of the gas barrier layer (X) is 5 to 50 nm,

(vi) the thickness of the transparent conductive layer (E) is 1 nm to 1 μm,

(vii) the surface in contact with the transparent conductive layer (E) of the hardened resin layer (U) has a surface electric resistivity of $1.0 \times 10^{13}\ \Omega/\square$ or more in an environment of 50℃ and 30% RH and that of $1.0 \times 10^{12}\ \Omega/\square$ or more in an environment of 50℃ and 90% RH, and

(viii) the laminated film has a water vapor transmission of 0.1 $g/m^2/day$ or less in an environment of 40℃ and 90% RH.

25. A transparent conductive substrate according to Claim 24,

wherein the hardened resin layer (U) comprises a vinyl alcohol-containing polysiloxane resin (P) obtainable from a coating composition containing a radiation curing resin, or a vinyl alcohol polymer, an epoxy group-containing silicon compound and an amino group-containing silicon compound or an organic polysiloxane resin (Q) obtainable from a coating composition containing an epoxy group-containing silicon compound and an amino group-containing silicon compound, the hardened resin layer (B) comprises the above-mentioned (P) or (Q), and the hardened resin layer (C) comprises the above-mentioned (P) or (Q).

26. A transparent conductive substrate, wherein a gas barrier laminated film is constructed of a hardened resin layer (U), a hardened resin layer (A), a transparent polymer substrate (S), a hardened resin layer (B), a gas barrier layer (X) comprising a metal oxide mainly composed of silicon oxide and a hardened resin layer (C) which are in contact with each other in this order, a transparent conductive layer (E) is placed on the hardened resin layer (U) of the gas barrier laminated film in contact with the (U), and the transparent conductive substrate satisfies the following (i) to (x):

(i) the water absorption coefficient is 2% or less,

(ii) the total light transmittance is 80% or more,

(iii) the thickness of the transparent polymer substrate (S) is 0.01 to 1.0 mm,

(iv) the retardation of the transparent polymer substrate (S) is 20 nm or less,

(v) the thickness of the gas barrier layer (X) is 5 to 200 nm,

(vi) the thickness of the transparent conductive layer (E) is 1 nm to 1 μm,

(vii) the hardened resin layer (U) comprises a vinyl alcohol-containing polysiloxane resin (P) obtainable from a coating composition containing a vinyl alcohol polymer, an epoxy group-containing silicon compound and an amino group-containing silicon compound or an organic polysiloxane resin (Q) obtainable from a coating composition containing an epoxy group-containing silicon compound and an amino group-containing silicon compound, and satisfies the following formulae (1), (2) and (3):

$$0.01 < (a)/(b) < 1.0 \quad (1)$$
$$0.01 < (c)/(b) < 0.5 \quad (2)$$
$$0.01 < (d)/(b) < 2.0 \quad (3),$$

herein (a) is the absorbance assigned to an O-H stretching vibration existing near 3500 cm^{-1}, (b) is the absorbance assigned to a C-H stretching vibration existing near 3000 cm^{-1}, (c) is the absorbance assigned to an $-NH_2$ in-plain deformation vibration existing near 1600 cm^{-1} and (d) is the absorbance attributable to an Si-O existing near 1100 cm^{-1}, in infrared absorption spectrum,

(viii) the hardened resin layer (B) comprises the above-mentioned (P) or (Q),

(ix) the hardened resin layer (C) comprises the above-mentioned (P), and

(x) the hardened resin layer (A) comprises a urethane resin.